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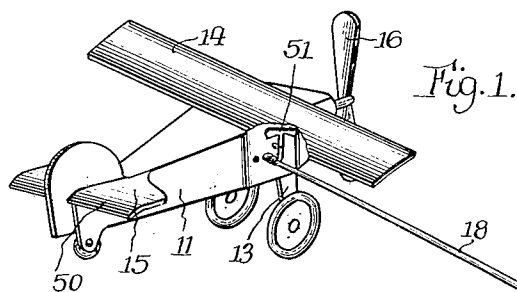
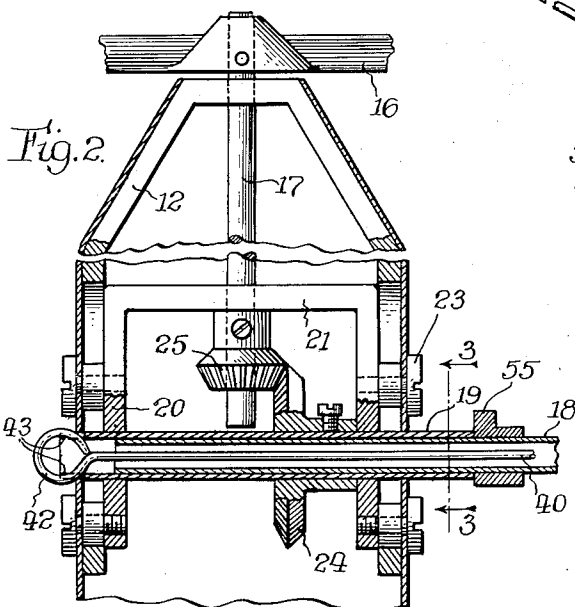
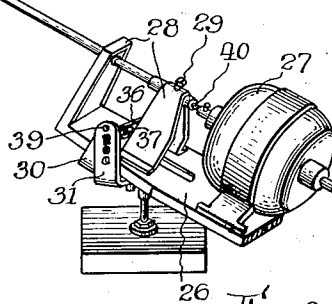
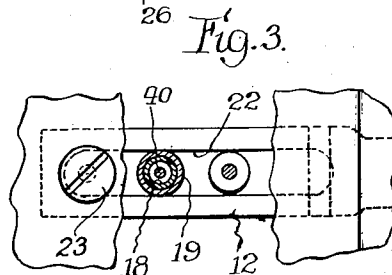
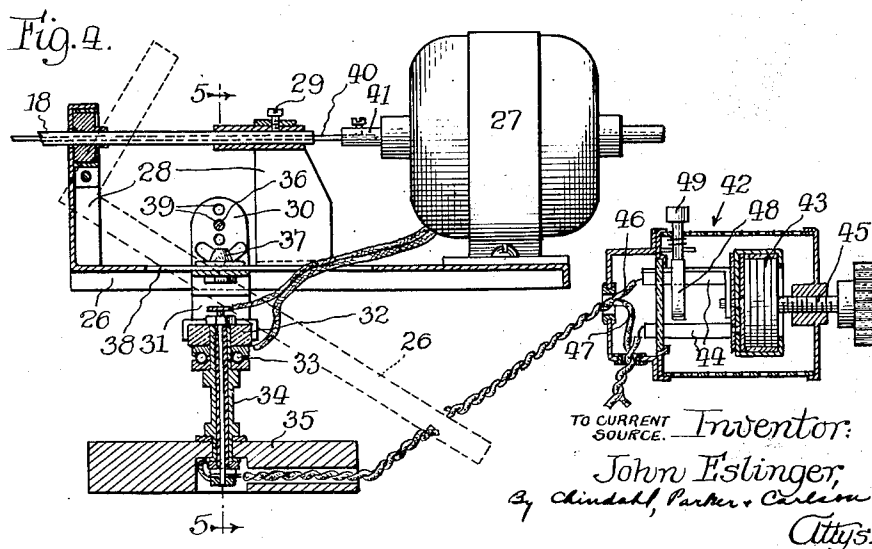
J. ESLINGER

1,980,391

AEROPLANE TOY

Filed June 18, 1931

2 Sheets-Sheet 1



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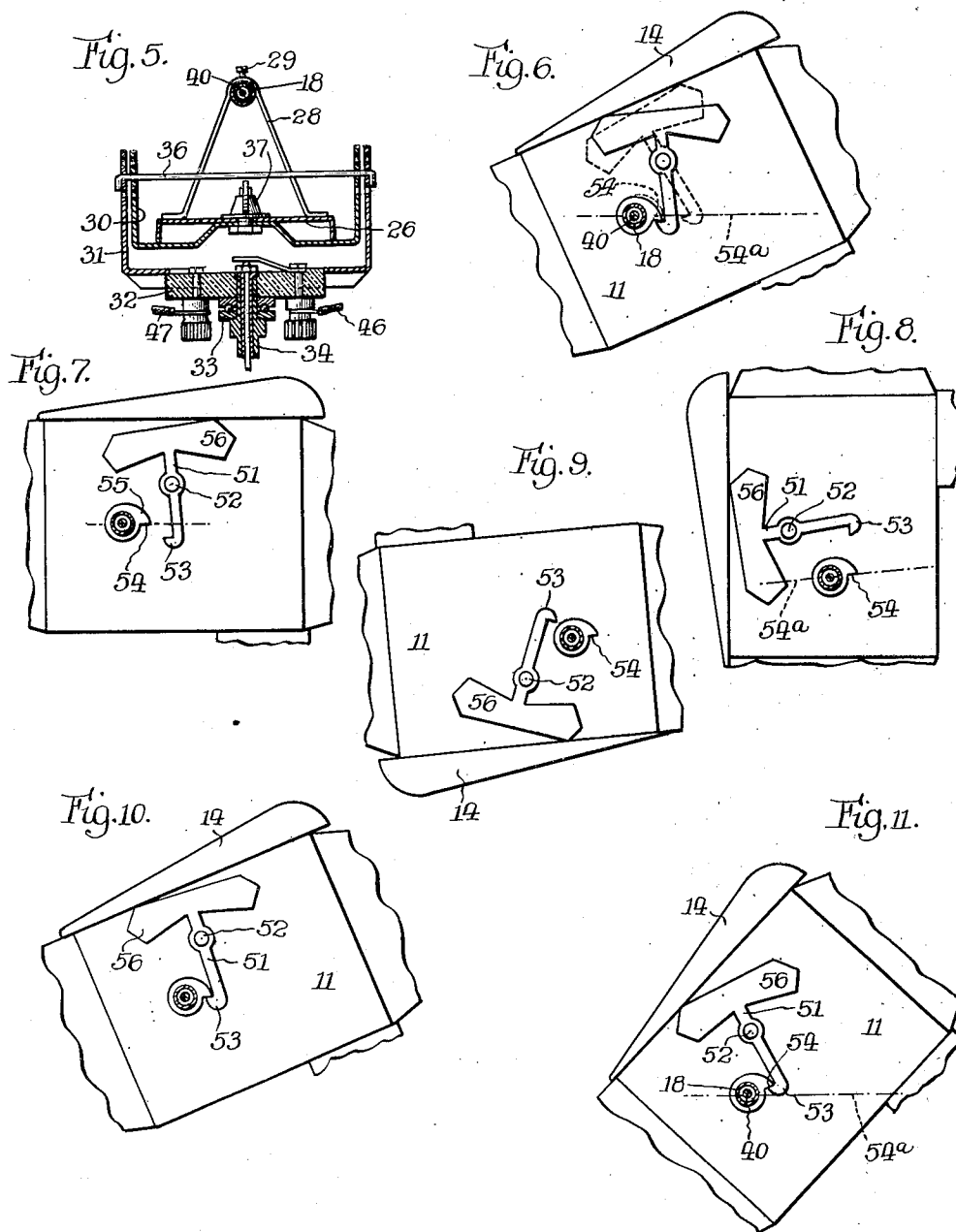
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,980,391

AEROPLANE TOY

John Eslinger, Chicago, Ill.

Application June 18, 1931, Serial No. 545,209

18 Claims. (Cl. 272—31)

My invention relates to aeroplane toys arranged to be driven by electric motors and has more particular reference to a toy in which the miniature aeroplane travels in a circular path about a vertical pivot under the power of a motor located adjacent the pivot.

An important object of the invention is to provide a toy of the above character having the aeroplane mounted in a novel manner so as to simulate closely the action of a commercial aeroplane during its flight and also in ascending from and descending to the supporting surface around which the plane travels.

Another object is to adapt the aeroplane to loop-the-loop at any time during its flight.

A further object is to provide a novel mechanism by which the looping action of the aeroplane may be controlled at the will of the operator and from a point exteriorly of the path traversed by the plane during its flight.

The invention also resides in the novel means by which the aeroplane is supported from a point near its turning axis and in the means for transmitting the motive power to the aeroplane propeller.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a perspective view of an aeroplane toy embodying the features of the present invention.

Fig. 2 is a plan sectional view of the forward portion of the aeroplane taken substantially in the plane of the driving shaft.

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view of the mechanism for defining the path of movement of the plane and for driving the same, the section being taken in the plane of the driving shaft. The view also shows the controlling rheostat in section.

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 4.

Figs. 6 to 11 are fragmentary side elevational views showing the aeroplane in different positions.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit

and scope of the invention as expressed in the appended claims.

In the drawings, the miniature aeroplane of the improved toy comprises a sheet metal body 11 built around a front frame 12 (Fig. 2) and adapted to be supported by a wheeled strut 13 at its forward end and a tail skid at the rear end. Being of the monoplane type, the aeroplane has the usual wings 14 and a tail 15. The propeller 16 is carried by a forwardly projecting shaft 17 journaled in the frame 12.

The means illustrated in the drawings for defining the movement of the aeroplane about a vertical pivot, at the same time permitting the aeroplane to rise and fall relative to a horizontal pivot, includes an elongated tubular rod 18 of small diameter having sufficient rigidity to sustain the weight of the aeroplane without appreciable bending. If desired, the rod may taper toward the aeroplane. The aeroplane is pivotally mounted on the smaller end of the tube which, for a purpose to later appear, projects into one side of the body 11 slightly behind the plane's longitudinal center of gravity.

To provide the pivotal mounting, the small end of the tube 18 is received in one end and terminates short of the other end of a transverse sleeve 19 (Figs. 2 and 3) which projects beyond opposite sides of the body 11 and is journaled in the legs 20 of a yoke 21 which also provides a bearing for the propeller shaft 17. This yoke is slidable along horizontal guideways formed by slots 22 in the frame member 12 to which it may be rigidly clamped by screws 23. By shifting the yoke 21 longitudinally of the plane, the spacing of the tube rearwardly of the plane's center of gravity may be adjusted as desired. The sleeve 19 drives the propeller 16 and for this purpose carries a bevel gear 24 meshing with a gear 25 fast on the rear end of the shaft 17 and made smaller than the gear 24 in order to rotate the propeller at a speed greater than that of the driving motor.

In order that the aeroplane may traverse a fixed circular path and rise and fall in its flight around such path, the end of the tube 18 opposite the aeroplane is mounted to turn about a vertical axis and also to tilt about an adjacent horizontal axis. In the present instance, such a mounting is provided by a turntable 26 which supports an electric motor 27 at one end and near its other end carries two standards 28 through which the tube 18 projects. The exact axial and angular positions of the tube are determined by a set screw 29.

Intermediate its ends, the turntable carries a U-shaped sheet metal yoke 30 nesting with a similarly shaped yoke 31 rigid with a plate 32 which is supported by a bearing 33 to turn about a vertical pedestal 34 as an axis. The pedestal is rigid with a base 35 which rests upon the supporting surface around which the aeroplane travels. The upstanding legs of the two yokes are pivotally connected by a rod 36 and the yoke 30 is secured to the turntable by a clamping bolt 37 which is adjustable along a slot 38 in the turntable to enable the spacing of the motor relative to the rod 36 to be varied.

With the tube 18 thus mounted, it will be apparent that the aeroplane, the tube, the turntable, and the yokes are adapted to turn as a unit around the pedestal as an axis under the tractive effort of the propeller. At the same time, the plane may ascend from or descend to the supporting surface as permitted by tilting of the turntable about the rod 36 as an axis.

The motor 27 being disposed on the side of the rod 36 opposite from the aeroplane, its weight exerts a lifting or counter-balancing action which tends to raise the plane from its supporting surface. Inasmuch as the bulk of the motor is disposed above the axis defined by the rod 36, it will be apparent that as the aeroplane rises from its supporting surface and the motor moves downwardly through a corresponding distance, the center of gravity of the motor moves away from the vertical plane through the axis 36. In this way, the counter-balancing effect increases automatically as an incident to the ascent of the aeroplane.

The rate of change of this counter-balancing action may be varied to suit conditions by changing the holes 39 in the yokes 30 and 31 through which the rod 36 projects. By this adjustment and that provided by the clamping bolt 37 and slot 38, the counter-balancing action is set at a value such that the weight of the aeroplane is nearly but not completely overcome when the plane is resting on its supporting surface but is completely overcome when the plane rises to a substantial height and the turntable is tilted out of horizontal position as shown in dotted outline in Fig. 4.

The power of the motor 27 is transmitted to the aeroplane through the medium of a shaft which may be in the form of a relatively small wire 40 having sufficient flexibility to adapt itself to the irregularities of the tube 18 and the slight curvature which the latter may assume during operation of the toy. Such a shaft permits the use of a tube having some flexibility and is adapted to transmit the power of the motor at high speed efficiently and without substantial noise. One end of the wire is joined by a coupling 41 to the motor shaft while the other end projects completely through the sleeve 19 and is formed with an eye 42 received in slots 43 in the end of the sleeve opposite from that into which the tube 18 projects. By connecting the shaft 40 and the sleeve 19 on this side of the plane's body, the free pivotal mounting of the plane on the tube is not disturbed.

To control the application of current to the motor windings, a rheostat 42 is employed preferably comprising a pile of carbon disks 43 forming an electrical connection of variable resistance between two binding terminals 44 according to the pressure under which the disks are placed by manipulation of a screw 45. One of the terminals leads to one of the power lines of

the current source while the other terminal is connected by a conductor 46 to one terminal of the motor winding. The other terminal of the latter is connected by a conductor 47 to the other power line. To effect a sudden application of the full line voltage to the motor for a purpose to be later described, a bar 48 is mounted within the rheostat casing normally out of contact with the terminals 44. By depressing a push-button 49, the bar is moved into contact with the terminals 44 thereby shunting the resistance out of the circuit and impressing the full line voltage upon the motor winding.

In view of the fact that the aeroplane is pivoted on the tube 18 and is therefore free to turn about the tube axis which extends transversely of the plane, rotation of the shaft 40 to drive the propeller produces a torsional force which tends to turn the aeroplane around the tube and cause the same to loop-the-loop. This looping tendency is proportional to the torque opposing rotation of the propeller which, as is well known in the design of fan blades, increases with the speed of rotation. That this is true, will be apparent from the fact that if the propeller is held against turning relative to the body of the plane which would simulate an excessive load on the propeller, rotation of the shaft 40 would cause the aeroplane as a whole to loop-the-loop around the tube 18 at the speed of rotation of the motor. On the other hand, when the propeller load is small, as when the shaft 40 is rotating slowly, the tilting tendency is too small to cause looping.

In the present instance, the propeller blades are pitched so that when the motor rotates the propeller in a direction to move the plane forwardly, the looping tendency above referred to is in a counter-clockwise direction as viewed in Fig. 1. In the present instance, the shaft 40 rotates in this same direction. Thus, the looping tendency acts in a direction to overcome the excessive weight of the forward end of the aeroplane due to the location of the tube 18 rearwardly of the plane's center of gravity. This looping tendency is further balanced by the tail of the aeroplane which is turned down slightly as indicated at 50 (Fig. 1) and acts while the plane is flying to raise the rear end of the plane slightly about the tube 18 as a pivot. The tail, thus constructed, also serves to stabilize the looping action and maintain the proper horizontal position of the plane in spite of slight and sudden changes in the looping tendency.

The action of the aeroplane in ascending from and descending to its supporting surface is rendered extremely realistic by virtue of the location of the pivotal mounting behind the plane's center of gravity and the looping tendency above mentioned which varies automatically with the speed of rotation of the propeller. In operation, the plane may remain at standstill on the supporting surface with the propeller idling at a slow speed. As the speed is increased, the plane may move in its fixed circular path with all three of its wheels contacting on the surface. In such a case, the speed of rotation of the propeller would not be such as to cause the excessive weight of the plane's forward end to be overcome. Now as the speed is increased further, the resulting lifting action overcomes the uncounterbalanced weight of the plane and the latter starts to rise. At this speed, the excessive weight of the forward end of the plane is overcome by the tendency of the plane to tilt about

the tube 18, with the result that the plane noses upwardly much the same as a commercial aeroplane. But as the plane gains speed, the tail 15 stabilizes the looping tendency and the plane proceeds in its horizontal flight without immediate looping. When the speed is reduced in order to cause the plane to ascend to its supporting surface, the accompanying reduction in the looping tendency enables the excessive weight of the forward end of the plane to nose the plane downwardly so that a realistic landing is made.

It will be apparent that when the plane is in full flight with the propeller rotating at a speed such that the looping tendency completely overcomes the forces tending to nose the plane downwardly, the plane will tend to loop-the-loop. As the nose of the plane points upwardly, the plane ascends to a higher level and the tractive effort decreases with the inclination of the plane.

Under these conditions, the plane may travel around its fixed path several times before looping, depending on the speed of the propeller. Eventually when the speed of the plane has been reduced sufficiently and the plane has reached a height such that its entire weight is counterbalanced as above described, actual looping takes place in a manner closely simulating that of a commercial aeroplane because, during the looping, the flight of the plane around its fixed path is interrupted. Such looping, while the plane is at standstill, is made possible by the fact that the entire weight of the plane is counterbalanced or overcome as above described at the elevation at which looping takes place.

When the aeroplane has once come to rest and completed one loop, there is a tendency for the plane to continue rather than to remain in horizontal position and then proceed further around its circular path. Means is therefore provided for limiting the looping action both as to the number of loops made and the time of looping, and also for enabling the aeroplane to fly at low levels around its circular path and at high speed without looping. The means herein employed operates automatically as an incident to the completion of one loop by the aeroplane to hold the aeroplane against further looping until the means has been rendered ineffectual by a manually operable control device adapted to be actuated from a remote point while the aeroplane is in flight.

In the present instance, the looping control comprises a device mounted on the aeroplane for movement automatically by the action of gravity and according to inclination of the plane into and out of engaging relation with respect to a non-rotatable part carried at the outer end of the tube 18. Herein said device is in the form of a latch 51 mounted intermediate its ends on a pivot 52 located slightly above and forwardly of the tube 18. At its lower end the latch is formed with a hook 53 adapted for engagement with a radially extending shoulder 54 defined by a lug 55 on a collar rigid with the outer end of the tube 18 and constituting the non-rotatable part above mentioned. At its upper end, the latch has two oppositely projecting lateral arms 56 which constitute weights for producing an over-center action as will later be described and which are adapted to engage the under side of the wing 14 and thereby limit the swing of the latch to a small angle.

It will be observed from Fig. 6 that in one limiting position of the latch, the shoulder 54 will be disposed in the path of the hook 53 so that when actual engagement takes place, the looping move-

ment of the plane will be arrested and the plane held against further looping until the latch is released. In the other limiting or inactive position shown in dotted outline in Fig. 6, the hooked end of the latch is positioned outwardly beyond the shoulder and will pass the shoulder without catching as the aeroplane starts a loop. According to their present positions, the shoulder and the hooked end are positioned for engagement when the plane is nosed upwardly slightly from a horizontal position as is clearly illustrated in Fig. 6.

In view of the mass of the arms 56 and of the hooked end 53, it will be apparent that the latch 51 will tend to swing into and remain in one limiting position or the other under the action of gravity, depending on the position of the center of gravity of the latch relative to a vertical line through the pivot 52. Thus, while the plane is in horizontal position and the latch is in active position, the center of gravity of the latch is disposed forwardly of the pivot 52 and the hook 53 will remain in position to engage the shoulder 54. As the nose of the plane is raised from such position, the center of gravity of the latch moves rearwardly toward the vertical line through the pivot 52. When the center of gravity passes behind this line, the latch will tend to swing into disengaged position.

As shown in dotted outline in Fig. 6, the shoulder 54 is raised slightly when the propeller is turning owing to the friction between the wire 40 and inner surface of the tube 18. This normal position is indicated by the line 54^a in the different figures. The shoulder is so positioned and the hook on the latch so constructed that the latch will pass over-center and endeavor to move out into inactive position just before the hook 53 reaches the shoulder 54 as the plane is tilting upwardly. This will be the case when the plane tilts upwardly in ascending initially from its supporting surface or after having traveled around its fixed path at a comparatively slow speed. But if the plane is turning about the tube 18 at a more rapid rate such as after the completion of one loop, the hook 53 will engage the shoulder 54 before the latch has had time to move into released position after its center of gravity has passed the vertical center line. It will thus be seen that a short interval of time is required for the inertia of the latch to be overcome and actual movement of the latch out of active position to occur. Thus, the latch will catch on the shoulder following the completion of one loop and thereby prevent further looping but will move to released position before the hook 53 reaches the shoulder 54 under other conditions, for example when the plane is ascending from its supporting surface.

When the latch once becomes engaged after looping of the aeroplane and the propeller continues to turn at a fairly high speed, the pressure existing between the radially disposed surfaces of the hook 53 and the shoulder 54 develops enough friction to prevent release of the latch even though the center of gravity is disposed considerably behind the pivot 52 thereby tending to cause disengagement. With the aeroplane thus held against further looping and substantially in horizontal position, the tractive effort of the rotating propeller again starts the aeroplane around its fixed path and at the high level attained during looping.

If the speed of the motor is sufficiently high, the centrifugal force developing as the plane trav-

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els around its circular path will have a vertical component of a magnitude sufficient to overcome the counter-balancing force tending to hold the aeroplane at its maximum height attained during looping. Thus, by speeding up the motor after looping, the aeroplane will be forced to a lower level at which the counter-balancing action exerted by the mass of the motor no longer overcomes the weight of the plane. In this way, the aeroplane is reconditioned for making a landing in response to a further decrease in the speed of the driving motor. So long as the latch remains in engagement with the shoulder 54, the speed of the aeroplane may be increased to any desired degree without danger of looping. Thus, after looping, the aeroplane is conditioned for traveling at high speed around its circular path.

In the course of one loop, the aeroplane passes successively through the positions illustrated in Figs. 8, 9 and 10, from which it will be seen that the latch remains in disengaged or inactive position while the plane is passing through vertical position (Fig. 8) and until it reaches the horizontal inverted position shown in Fig. 9, whereupon the center of gravity of the latch will be disposed forwardly of the pivot 52 and the latch will move into active position. This relation of the pivot 52 and the center of gravity of the latch prevails until the plane has reached the normal horizontal flying position and the hook 53 approaches the shoulder 54. However, since the plane is tilting about the tube 18 at a comparatively rapid rate following the completion of a loop, withdrawal of the latch does not take place by the time that the engagement between the hook and the shoulder occurs. The latch thus catches on the shoulder as shown in Fig. 10 and the plane becomes locked effectually against further looping.

Release of the latch may be effected and the plane again conditioned for looping without interrupting the operation of the toy. One way of accomplishing this result is to decrease the speed of the motor 27 by manipulation of the rheostat so as to reduce the pressure between the latch surfaces and to allow the plane to nose downwardly sufficiently to move the hook out of contact with the shoulder 54. When this latter occurs, the center of gravity of the latch will still be disposed rearwardly of the pivot 52 and the latch will immediately move out of the way of the shoulder. As an incident to this movement, the center of gravity becomes disposed still further behind the pivot 52 with the result that the latch will remain in disengaged position while the plane continues to fly in horizontal position (see Fig. 7). Then to effect another looping of the plane, it is merely necessary to speed up the motor and thereby increase the looping tendency to the proper degree for looping to occur in the manner previously described.

The latch 51 may also be released by causing a sudden and momentary increase in the speed of the motor thereby producing a sudden and abnormally high increase in the tendency of the plane to nose upwardly about the tube 18 as above described. This may be accomplished by depressing the push-button 49 and thereby forcing the bar 48 into engagement with the terminals 44 which shunts out the resistance element 43 and applies the full line voltage to the motor. The plane is thus tilted upwardly into the position shown in Fig. 11, and because the latch is engaged, torsional force is exerted on the tube 18 imparting energy thereto. Then when this sudden cur-

rent application is interrupted and the load on the propeller accordingly reduced, as will be the case when the button 49 is released, the energy thus stored in the tube 18 will be imparted to the aeroplane in a direction reverse to the looping tendency and the plane will be tipped downwardly to an inclination such that the latch will disengage the shoulder 54. Thereafter the aeroplane will nose upwardly of its own accord at a slower rate allowing the latch to move to disengaged position in the same manner as when the plane is initially ascending from its supporting surface.

The adaptation of the aeroplane for looping and the provision of means for controlling the looping action, enables the present toy to simulate closely various movements of a commercial aeroplane other than those of ascending and descending from a supporting surface. The interest of the operator of the toy is retained by virtue of the various different ways in which the aeroplane may be controlled in its flight by manipulation of the rheostat.

The present application is a continuation in part of my copending application Serial No. 427,708, filed February 12, 1930.

I claim as my invention:

1. An aeroplane toy comprising, in combination, a miniature aeroplane having a rotatable propeller at its forward end, a bearing member carried by the body of said aeroplane and arranged for adjustment in a direction longitudinally of the aeroplane, an elongated member having one end projecting into one side of the aeroplane body and journaled in said bearing member so as to support the aeroplane for pivoting on said elongated member about an axis disposed rearwardly of the longitudinal center of gravity of the aeroplane and shiftable relative to such center by relative movement between said body and said bearing member, means supporting the opposite end of said elongated member to define a circular path of movement for the aeroplane while permitting the latter to rise and fall in its flight, and an electric motor arranged to drive said propeller in a direction to produce a torque opposing the excessive weight of the forward end of said aeroplane.

2. An aeroplane toy comprising, in combination, a substantially rigid horizontal tube supported at one end to turn about a vertical axis and held against rotation about its longitudinal axis, a miniature aeroplane pivoted on the other end of said tube to turn freely about an axis extending transversely of the aeroplane, an electric motor disposed adjacent said vertical axis, and a wire extending through said tube and coupled at one end to the shaft of said motor, the other end of said wire having a bevel gear connection with the propeller shaft of said aeroplane.

3. In an aeroplane toy of the character described, the combination of a miniature aeroplane having a propeller at its forward end with the shaft thereof extending longitudinally of the aeroplane body, a rotatable sleeve extending transversely of said body and having a bevel gear connection with said shaft, an elongated tube projecting into one end of said sleeve and providing a pivot for permitting said aeroplane to turn about a transverse axis, and a drive shaft disposed within said tube and having a driving connection with said sleeve at a point beyond the end of said tube.

4. An aeroplane toy comprising, in combina-

tion, an elongated non-rotatable tube supported adjacent one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane pivotally mounted on the opposite end of said tube to turn about a transverse axis located behind the longitudinal center of gravity of the aeroplane, a motor located remotely from the aeroplane and arranged to drive the propeller of said aeroplane in a direction to draw the plane forwardly and produce a turning movement about said tube causing the aeroplane to loop-the-loop when said propeller is rotating above a predetermined speed, a shoulder on said tube against said aeroplane, and a latch movably mounted on the body of said aeroplane and acting automatically to engage said shoulder after the aeroplane has completed a loop whereby to hold the aeroplane in substantially horizontal position against further looping.

5. An aeroplane toy comprising, in combination, an elongated non-rotatable tube supported adjacent one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane pivotally mounted on the opposite end of said tube to turn about a transverse axis, a motor for driving the propeller of said aeroplane to produce a forward tractive effort and a tendency of the aeroplane to loop-the-loop depending on the speed of rotation of the propeller, a T-shaped hook pivoted intermediate its ends in upright position forwardly of said tube and swingable from inactive to active position during looping of the aeroplane and from active to inactive position as the aeroplane tilts upwardly after looping, and a substantially horizontal shoulder rigid with said tube and adapted to be passed by said hook after the latter has moved to inactive position but engageable by the hook before the latter leaves active position while the aeroplane is turning about said tube at a rapid rate following the completion of one loop.

6. An aeroplane toy comprising, in combination, an elongated non-rotatable tube supported adjacent one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane pivotally mounted on the opposite end of said tube to turn about a transverse axis, a motor for driving the propeller of said aeroplane to produce a forward tractive effort and a tendency of the aeroplane to loop-the-loop depending on the speed of rotation of the propeller, a latch pivotally mounted on the aeroplane body to swing between active and inactive positions about an axis extending parallel to said tube, the center of gravity of said latch shifting automatically from one side of said axis to the other during upward tilting of the aeroplane through a substantially horizontal position whereby the latch tends to move from active to inactive position, and a shoulder rigid with said tube and positioned for engagement by said latch subsequent to the time when said center of gravity passes over-center, said latch thereby passing said shoulder without engagement during slow upward tilting of the aeroplane but engaging the shoulder when the aeroplane is turning about said tube at high speed such as after looping.

7. An aeroplane toy comprising, in combination, an elongated non-rotatable member supported at one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane having a propeller and pivotally mounted on the opposite end of said member to turn on a transverse axis, power driven means for rotating said propeller whereby to produce a forward

ward tractive effort and a tendency of the aeroplane to loop-the-loop about said axis, a shoulder on said member, and a device movably mounted on the aeroplane body acting automatically to engage said shoulder and prevent looping following the completion of one loop but passing the shoulder without engagement when the aeroplane is tilting at a slower rate about said axis.

8. An aeroplane toy comprising, in combination, an elongated non-rotatable member supported at one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane having a propeller and pivotally mounted on the opposite end of said member to turn on a transverse axis, power driven means for rotating said propeller whereby to produce a forward tractive effort and a tendency of the aeroplane to loop-the-loop about said axis, a shoulder on said member, and a device movably mounted on the aeroplane body acting automatically to engage said shoulder and prevent looping following the completion of one loop but passing the shoulder without engagement when the aeroplane is tilting at a slower rate about said axis, said device, when engaging said shoulder, being releasable automatically as an incident to a decrease in the speed of rotation of said propeller.

9. An aeroplane toy comprising, in combination, an elongated non-rotatable member supported at one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane having a propeller and pivotally mounted on the opposite end of said member to turn on a transverse axis, power driven means for rotating said propeller whereby to produce a forward tractive effort and a tendency of the aeroplane to loop-the-loop about said axis, a shoulder on said member, and a device movably mounted on the aeroplane body acting automatically to engage said shoulder and prevent looping following the completion of one loop but passing the shoulder without engagement when the aeroplane is tilting at a slower rate about said axis, said device, when engaging said shoulder, being releasable automatically upon a momentary and sudden increase in the speed of rotation of said propeller.

10. An aeroplane toy comprising, in combination, an elongated non-rotatable member supported at one end to turn horizontally about a vertical axis and to tilt vertically, a miniature aeroplane having a propeller and pivotally mounted on the opposite end of said member to turn on a transverse axis, power driven means for rotating said propeller whereby to produce a forward tractive effort and a tendency of the aeroplane to loop-the-loop about said axis, a shoulder on said member, a device movably mounted on the aeroplane body and acting automatically to engage said shoulder and prevent further looping after one complete loop has been executed, said device passing said shoulder without engagement as the aeroplane turns about said member at a slower rate, and means by which the speed of said motor may be increased suddenly and momentarily whereby to twist said member and impart energy thereto for turning the aeroplane reversely to release said device and thereby recondition said aeroplane for looping.

11. An aeroplane toy comprising, in combination, a miniature aeroplane arranged to fly in a fixed circular path under its tractive effort and adapted for looping-the-loop about an axis extending transversely of the aeroplane, an electric motor located remotely from the aeroplane and

adapted to drive a propeller of said aeroplane whereby to produce a tractive effort and a tendency of the aeroplane to loop-the-loop, and means acting automatically as an incident to the completion of one loop to prevent further looping.

12. An aeroplane toy comprising, in combination, a miniature aeroplane arranged to fly in a fixed circular path under its tractive effort and adapted for looping-the-loop about an axis extending transversely of the aeroplane, an electric motor located remotely from the aeroplane and adapted to drive a propeller of said aeroplane whereby to produce a tractive effort and a tendency of the aeroplane to loop-the-loop, means acting automatically as an incident to the completion of one loop by the aeroplane to hold the latter against further looping, and means controllable from a point remote from said aeroplane for releasing said device and thereby reconditioning the aeroplane for looping.

13. An aeroplane toy comprising, in combination, a miniature aeroplane arranged to fly in a fixed circular path under its tractive effort and adapted for looping-the-loop about an axis extending transversely of the aeroplane, an electric motor located remotely from the aeroplane and adapted to drive a propeller of said aeroplane whereby to produce a tractive effort and a tendency of the aeroplane to loop-the-loop, means acting automatically as an incident to the completion of one loop to prevent further looping, and means for arresting the motion of said aeroplane about said axis following the completion of one loop comprising a part movable around said path with the aeroplane but non-rotatable about said axis and a second part on the aeroplane body movable automatically into and out of engageable relation with respect to said first part as an incident to changes in the inclination of said aeroplane.

14. In an aeroplane toy of the character described, the combination of a miniature aeroplane having a rotatable propeller, an elongated member projecting into one side of the aeroplane body and providing a transverse pivot about which the aeroplane is adapted to turn, means associated with the other end of said member to define a fixed circular path of movement of the aeroplane while permitting the aeroplane to rise and fall in its flight around such path, an electric motor for driving said propeller located adjacent the center of said path, means for effecting gradual variations in the speed of rotation of said motor, and independently operable means for producing a sudden and momentary increase in the motor speed.

15. In an aeroplane toy of the character described, the combination of a miniature aeroplane having a rotatable propeller, an elongated member projecting into one side of the aeroplane body and providing a transverse pivot about which the aeroplane is adapted to turn, means associated with the other end of said member to define a fixed circular path of movement of the aeroplane while permitting the aeroplane to rise and fall in its flight around such path, an electric motor for driving said propeller located adjacent the center of said path, a rheostat for effecting gradual

variations in the speed of rotation of said motor, and a switch for shunting the rheostat out of said motor circuit whereby to effect a sudden variation in the speed of said motor.

16. An aeroplane toy comprising, in combination, a miniature aeroplane having a body and a propeller at the forward end thereof, an elongated member non-rotatable about its own axis and having one end projecting into the side of said body to support the aeroplane for pivoting thereon about a substantially horizontal axis defined by said member and disposed behind the longitudinal center of gravity of the aeroplane, means associated with the other end of said member and acting therethrough to support the aeroplane, for movement in a fixed circular path, and an electric motor located exteriorly of the aeroplane and having a power transmitting connection to rotate the propeller in a direction to produce a torque opposing the excessive weight of the forward end of said aeroplane due to the location of said axis.

17. An aeroplane toy comprising, in combination, a miniature aeroplane having a rotatable propeller, an elongated substantially rigid member non-rotatable about its longitudinal axis and defining a fixed circular path of movement for said aeroplane, said member having one end projecting into the body of said aeroplane and providing a horizontal pivot spaced rearwardly from the longitudinal center of gravity of the aeroplane, and an electric motor having a power transmitting connection with said propeller for driving the same in a direction to draw the aeroplane forwardly and produce a torque about said axis opposing the excessive weight of the forward end of said aeroplane due to the location of said pivot, the pitch of said propeller and the distance between said axis and center of gravity being proportioned to create a torque opposing but not overcoming the excessive weight of the forward end of the aeroplane at low speeds and completely overcoming said weight when the propeller is rotating at comparatively higher speeds.

18. An aeroplane toy comprising, in combination, a miniature aeroplane having a propeller and a tail with a downwardly and rearwardly inclined under surface tending in the flight of said plane to raise the rear end of the latter above the forward end, an elongated substantially rigid member having one end projecting laterally into the side of said plane and pivotally supporting the latter to turn on a transverse axis disposed rearwardly of the longitudinal center of gravity of the plane whereby the excessive weight of the forward end of the plane tends to lower such end, said member being held against rotation about its own longitudinal axis, means associated with the other end of said member supporting the same to turn about a vertical axis while permitting the plane to rise and fall in its flight around the latter axis, and an electric motor located adjacent said vertical axis and having a power transmitting connection with said propeller for rotating the same in a direction to pull the aeroplane forwardly and produce a torque opposing the excessive weight of the forward end of the plane due to the location of said first mentioned axis.

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